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(71) Applicant(s)
Mark Christoper Krawczynski

(54) Inventor(s)
Mark Christoper Krawczynski

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(71) Applicant(s)
MARK CHRISTOPER KRAWCZYNSKI

(72) Inventor(s)
MARK CHRISTOPER KRAWCZYNSKI

(57) Claim

1. A tent-like framed weather protection structure, similar in size to a carport or garage , consisting of a fabric skin supported on a frame assembly.

2. The tent-like structure of claim 1 wherein the fabric skin comprises a plastic material resistant to UV light and resistant to mildew and rotting.

3. The tent-like structure of claim 1 wherein the support framing comprises opposing tubular curved compression arches springing from common central points with the covering skin being stretched between these arches. The hypar, double-curved membrane structure thus created is kept stable by means of tensioning the guy ropes which in turn "spread out" the arch frames.

Form 10

PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

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Priority:

Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant: MARK CHRISTOPHER KRAWCZYNSKI

Address of Applicant: 23 THE KINGSWAY, ROSEVILLE CHASE, 2069, N.S.W.

Actual Inventor: MARK CHRISTOPHER KRAWCZYNSKI

Address for Service: AS ABOVE

Complete Specification for the invention entitled: CAR CAPSULE (APPL. NO. PJ4228)

The following statement is a full description of this invention, including the best method of performing it known to me:—*

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* Note: The description is to be typed in double spacing, pica type face, in an area not exceeding 250 mm in depth and 160 mm in width, on tough white paper of good quality and it is to be inserted inside this form.

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TECHNICAL FIELD OF THE INVENTION :

This invention relates to a new design and a new application for tent structures. It is a structure which provides a tent-like alternative to the garage or carport, but can also be used to give weather protection to such outdoor activities as entertaining, dining or clothes drying.

BACKGROUND AND PROBLEMS WITH THE "PRIOR ART" :

Previously, rigid garage structures or carports were the only building types considered suitable for providing protection for motor vehicles against the elements of weather and environment. These were bulky, "boxy" and unsightly and needed maintenance which was often neglected. Ugly, rusting metal-clad structures still mar the streetscape in many suburbs.

Till recent times, tent-like structures were not suitable for carport functions because fabrics were not adequately strong or resistant enough against sunlight and rotting. Even the good quality tents were usually unable to last for more than 12 months if left exposed continuously to direct sunlight or wet weather.

New high strength and light weight fabrics are now being created with compounds that make them resistant to UV rays as well as "rotting" in moist conditions. But the difficulty still existed in making a tent structure which would have suitable proportions to house a car without wasteful bulk, as well as being rigid enough and having adequate ventilation.

Stability in large tent structures is difficult to achieve without extensive stabilising with guy ropes which require far greater area than the usable floor space.

ESSENTIAL FEATURES OF THE INVENTION :

The above problems are overcome by the present invention which provides a tensioned fabric cover over a frame assembly which is itself semi-rigid in one direction and made stable in the other direction by the use of guy ropes or struts. The configuration is such that all support and stabilising elements have minimal projection beyond the usable floor area under the "roof". This enables erection in small spaces such as backyards of terrace houses or similar.

In one form, the invention comprises two "opposing" ring-like compression frames over which is stretched a durable high-strength fabric. The ring-like frames make most efficient structural use of the material because they have no bends or elbows and are therefore very thick, but extremely strong. Being continuously curved, they distribute all stress most evenly. The fabric is then draped over the frames to form a double curvature known as a hypar shape or a hyperbolic paraboloid. The triangular bottom fasteners provide the tensioning in a secondary direction. The primary tensioning is lengthwise between the "rings" by the use of at least 4 guy ropes. The two primary elements of fabric and frame are thus working together to provide a semi-rigid hypar structure of incredible strength, but with some flexibility. Because the shape is a continuous double

curve, the structure is self draining and self cleaning. The open ends provide for maximum ventilation although in another form, the sides and ends can be enclosed and closable vented panels be incorporated for complete weather protection.

In another form, the structure could be tensioned and therefore strengthened even further by providing a tensioning strand in a sleeve across the middle of the curve and anchored down on either side at the bottom of the triangle. Another type of strengthening could be provided by adding a third "ring" frame at the mid-point of the span. Both of these techniques would be advantageous in areas of extreme wind exposure.

DESCRIPTION OF AN EXAMPLE OF THE INVENTION :

To assist with the understanding the invention, reference should be made to the accompanying drawings :

DRAWINGS :

Fig.1 and 2: show simplified 3-dimensional views of the structure according to this invention with a printed pattern on the membrane fabric.

Fig 3 : Shows side and end elevations. Additional side panels have been included.

Please note that the end elevation shape is approximate only. Model tests indicate more uniform curvature.

Fig 4 : Shows an amended form of the invention, comprising an additional ring frame for use in high wind areas.

Fabric must be stable, high strength, non-organic base such as polyester coated with bo nded layers of PVC, including UV inhibitors of high quality. This prevents rotting and premature break-down from exposure to sunlight. Joints have to be continuously welded, preferably using high frequency welding equipment, although because the contact areas are long, normal heat welding would suffice. The edge attachment to the frame is by a continuous sleeve or by means of shorter strap sections.

The frame members comprise "clusters" of 3 to 5 tubes of approximately 12 mm diameter each. This enables curvatures to be achieved without the use of heat. The "cluster" pipes are strapped together at 300mm centres after being bent to shape. The tubing material is to be sunlight resistant PVC piping, but copper or aluminium tubing is also able to be used. The number of tubes in each cluster depends on the weight of the fabric selected, the lightest recommended being 500gms/m^2.

The ends of the tube clusters are anchored with one base plate on each side of the structure. The base plates are anchored down with 600mm long hook bolts which are cast into concrete pads where soft soil conditions prevail.

The guy ropes are attached to the ring frames at third points along their length. They are also anchored to the ground with 600mm long hook bolts which are se t in concrete pads, if the ground is soft.

After the 6 primary anchor points have been secured and the fabric has been subjected to primary tensioning, the best results will be achieved if secondary tensioning is carried out. As shown in Figure 3, a tensioning drawstring is provided inside a sleeve which is welded across the centre of the fabric shape. This should be attached to the main base plate and tensioned sufficiently to eliminate any "flaps" in the fabric.

For extremely high wind areas, a third "ring" frame may be provided for additional support and to allow higher levels of tensioning to be achieved.

A critical aspect of this invention is the creation of the optimum "pattern" or shape for the fabric cover so that no "wrinkling" occurs and so that structural stresses are distributed evenly over the whole frame. Because these stresses depend on the weight of the fabric selected, the most suitable "pattern" will be most easily realised by building a frame prototype to full size and tensioning the fabric and welding it "in-situ". Computer patterning may also be possible if the right software is available.

The claims defining the invention are as follows :

1. A tent-like framed weather protection structure, similar in size to a carport or garage , consisting of a fabric skin supported on a frame assembly.

2. The tent-like structure of claim 1 wherein the fabric skin comprises a plastic material resistant to UV light and resistant to mildew and rotting.

3. The tent-like structure of claim 1 wherein the support framing comprises opposing tubular curved compression arches springing from common central points with the covering skin being stretched between these arches. The hypar, double-curved membrane structure thus created is kept stable by means of tensioning the guy ropes which in turn "spread out" the arch frames.

4. The tent-like structure of claim 1 wherein the support framing comprises 3 tubular curved compression arches, with the outside arches kept stable by tensioning guy ropes.

5. The tent-like structure of any one of claims 1 to 4 comprising enclosing end panels with closable access openings.

6. The tent-like structure of any one of claims 1 to 5 comprising a kit-form package for self-assembly by the purchaser.

7. The tent-like structure of any one of claims 1 to 5 comprising a complete structure with supply and assembly by the manufacturer.

8. The tent-like structure of any one of claims 1 to 5 comprising removable ground anchorages to permit dismantling and re-assembly.

9. The tent-like structure of any one of claims 1 to 5 comprising a tensioning strand at the mid-point of the span to reduce wind flap.

10. The tent-like structure of any one of claims 1 to 5 comprising stabilising guy members which are solid.

11. The tent-like structure of any one of claims 1 to 5 comprising a transportable kit which can be dismantled and re-assembled.

12. The tent-like structure of any one of the claims 1 to 5 capable of being used as protection against the elements for any outdoor activity, including clothes drying, entertaining or dining.

13. A tent-like weather protection structure substantially as herein described with reference to the accompanying drawings.

Dated this EIGHTEENTH day of MAY 1990.

MARK CHRISTOPHER KRAWCZYNSKI
NAME OF APPLICANT

Note : If there is insufficient space above to type the statement of claim, do not use this sheet, but use separate sheets of paper beginning with the works "The claims defining the invention are as follows", and ending with the date and the name of the applicant in block letters.

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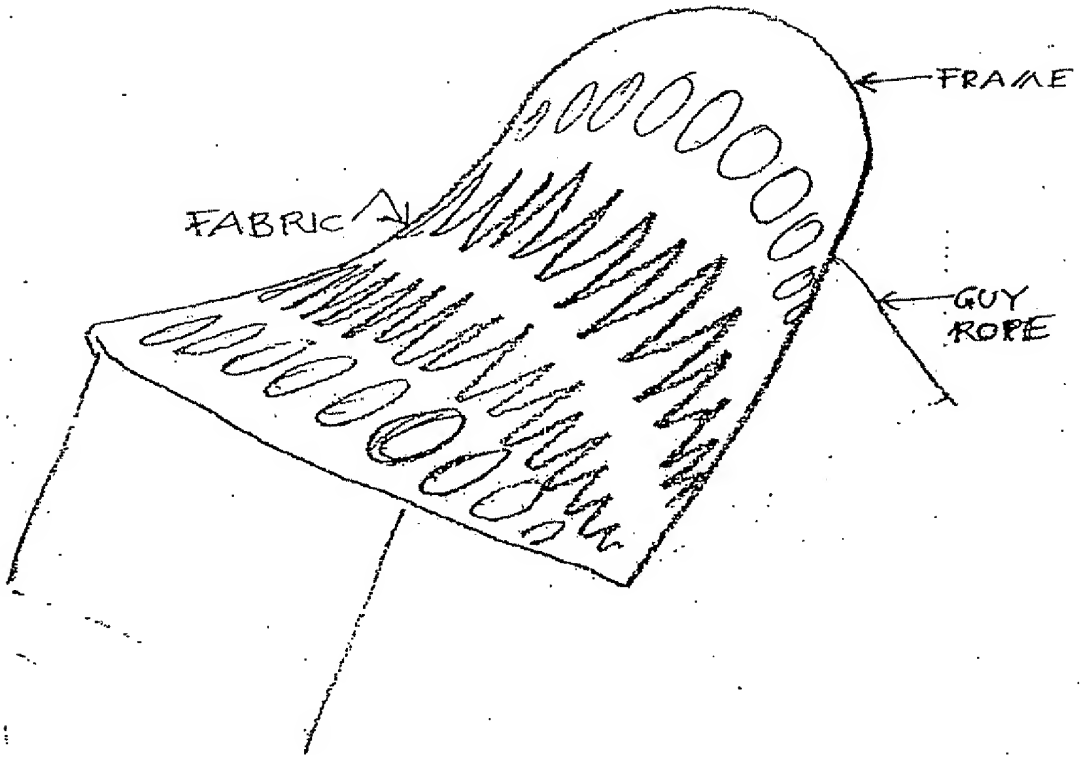

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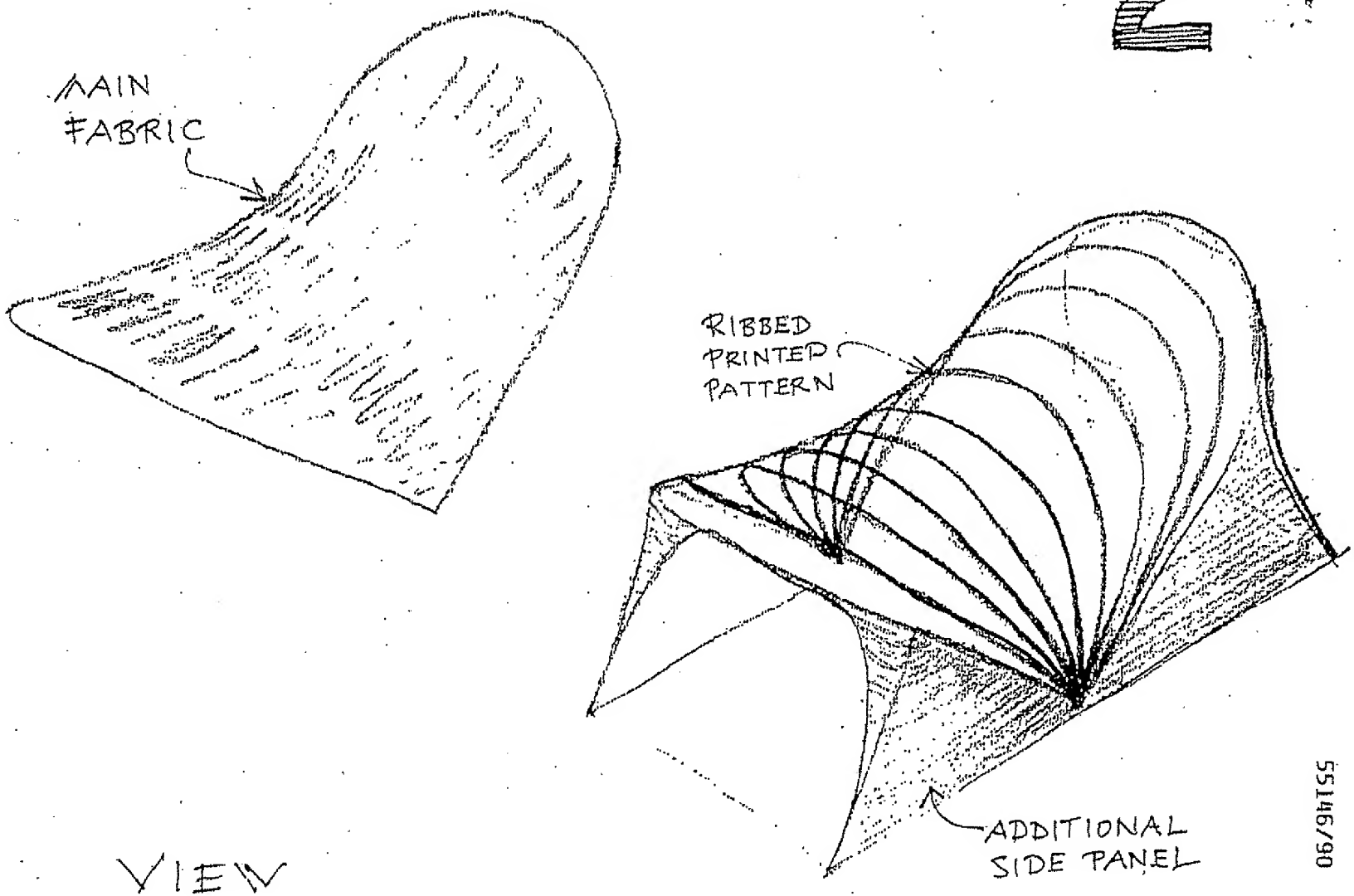

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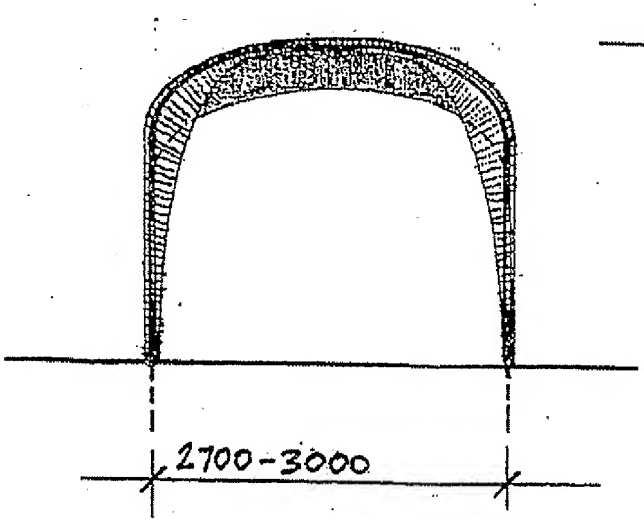

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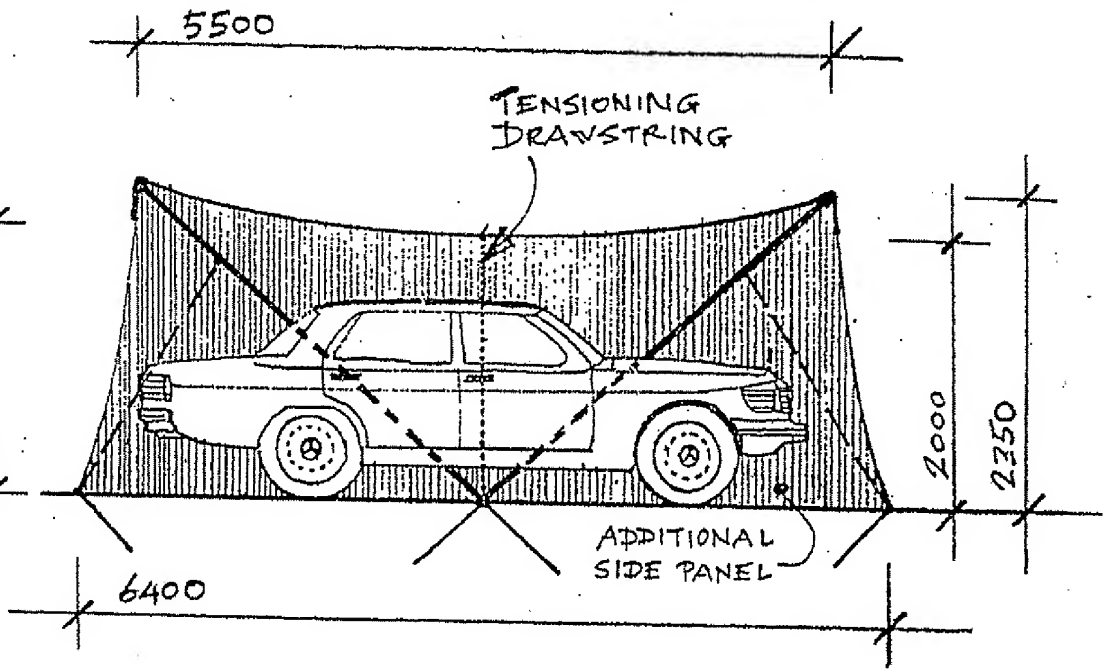

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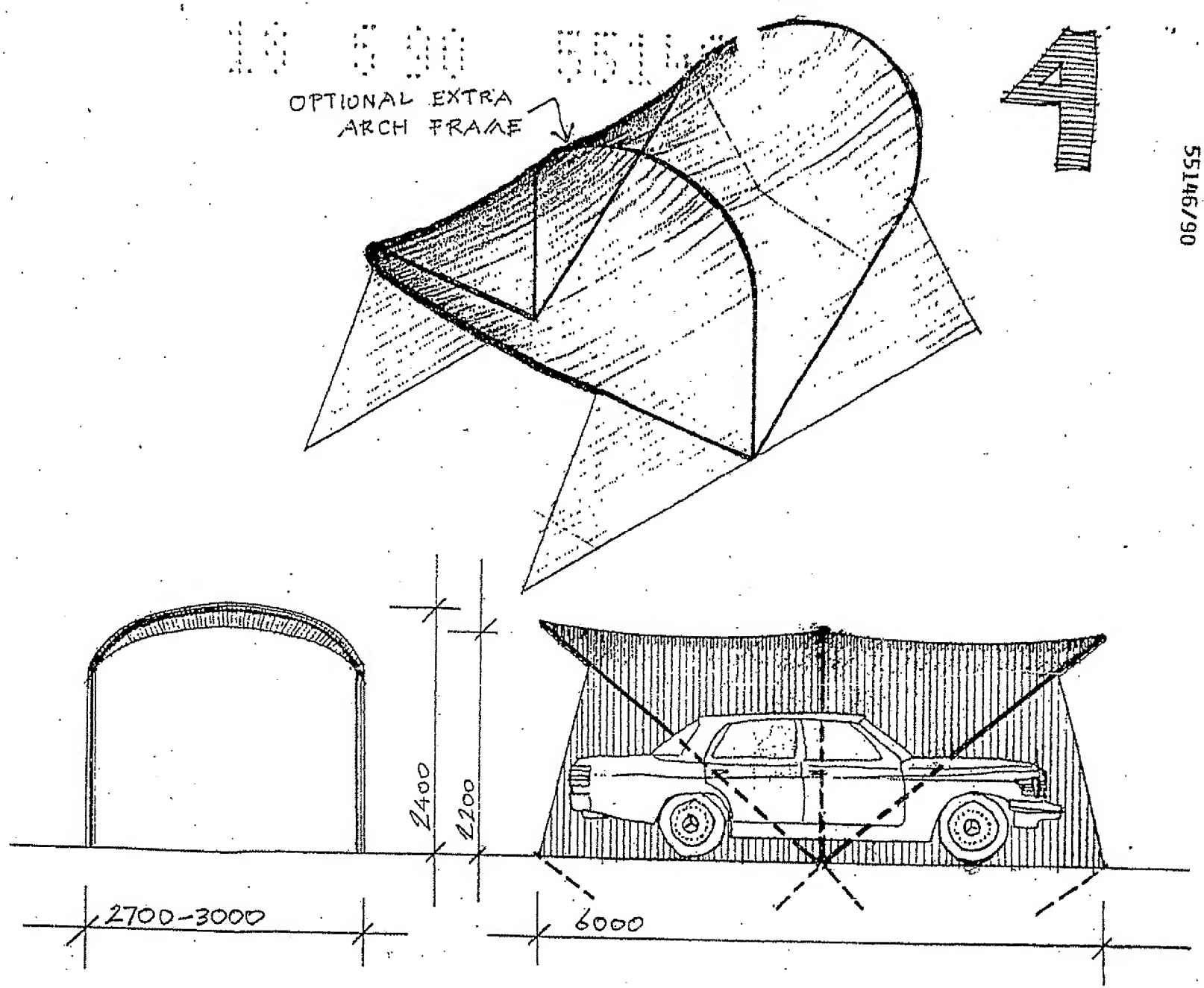

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